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ABSTRACT

The use of land for outdoor recreation is becoming more and more important, and the increased use of the land has raised the risk of man-caused forest fires. The purposes of this study were (1) to determine the kinds and numbers of visits that people are making to public forests, (2) to identify the social characteristics of forest users, (3) to measure the amount of information people had about preventing forest fires, (4) to discover how people obtained reliable information about forest-fire prevention, and (5) to recommend more effective programs for fire prevention on the basis of the information obtained in the study. A sample of 901 persons were interviewed in Utah County, Utah, and the results were compared to a similar study conducted earlier in Butte County, California. Recommendations for more effective fire-prevention programs included additional research, education, and information programs. (DK)

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FOREST-FIRE PREVENTION KNOWLEDGE AND ATTITUDES OF RESIDENTS OF UTAH COUNTY, UTAH, WITH COMPARISONS TO BUTTE COUNTY, CALIFORNIA

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ABSTRACT

A representative sample, consisting of 901 persons, was interviewed in Utah County, Utah, to determine the characteristics of forest users. These characteristics were related to the population's knowledge and attitudes regarding the forest resource and its protection from fire. Comparisons were made with a similar study conducted earlier in Butte County, California.

Nearly eight out of ten of the Utah County residents had visited a National Forest at least once during the year preceding the study. Frequency of such visits was related to age, sex, marital status, education, occupation, income, and residence.

Knowledge about fire prevention was higher among the Utah population than among the comparable Californians. Frequent forest visitors, especially hunters and fisherman, scored better than average on the knowledge test.

Although few felt forest fires presented a serious threat to themselves or their property, most felt keenly the danger to public forest property. Responsible attitudes were particularly characteristic of older, urban-dwelling, fire-experienced, authority-tolerant, and fire-knowledgeable persons.

Television, radio, and newspapers were mentioned in that order as mass communications sources of forest-fire knowledge. Smokey Bear was by far the most frequently remembered item from these communications.

Recommendations from the study for developing effective fire prevention programs include recognition that such programs must be geared to all of the people. Special attention should be given to active users of the forest who are ill-informed and poorly motivated regarding the use of fire. Stress should be placed on the fact that the National Forests are *their* forests. Forest personnel should demonstrate this fact by their attitude and behavior.

Forest-Fire Prevention Knowledge and Attitudes of Residents of Utah County, Utah, with Comparisons to Butte County, California

John R. Christiansen*, William S. Folkman**,
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INTRODUCTION

Societal changes in the United States are having a dynamic impact on the use and management of our National Forests. Whereas only a few decades ago most of our public forest land was in a custodial state, today we are seeing a rapid implementation of the multiple-use-concept.

The multiple-use-concept involves the coordinated and harmonious management of uses and resources such as forage, recreation, timber, water, and wildlife.

Use of land for outdoor recreation is becoming increasingly important. Expenditures of public funds for outdoor recreation have risen from 553 million dollars in 1951 to 1,151 million dollars in 1960.[1] The total number of people who engaged in sport fishing and/or hunting increased from 30,435,000 in 1960 to 32,881,000 in 1965.[2] In 1965 the expenditures of these sport fishermen and hunters amounted to $4,046,000,000 or $123.06 per person.[3]

The increased demands upon the public forest lands for recreational purposes result in part from the changing characteristics of this country's population. Among the most pertinent of these changing characteristics are the following: nearly every other person in the country is less than 28 years of age; personal income and living standards are rising for the majority of citizens; white-collar Americans are the biggest, fastest-growing group in the labor force; people are moving away from farms and small towns to the big cities and suburbs; and Americans are taking more time for recreation, particularly outdoor recreation.

Although, fortunately, risk does not increase proportionately with use, with the increasing number of persons entering the national forests for recreational purposes, the risk of man-caused forest fires has increased. This fire risk has been heightened even more by the use of forest lands by an expanding number of workers as well. Workers come into the wildland areas not only for traditional occupational uses of the forests, but for construction of power lines, telephone and television facilities, highways, and water conservation projects.

With the rise in forest-fire risk there has been an increase in research and development designed to prevent and control forest fires. Both

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[1]U.S. Bureau of the Census, *Statistical Abstract of the United States: 1967*. (88th edition.) Washington, D. C., 1967, p. 210.

[2]*Statistical Abstract of the U.S.: 1967*, p. 211.

[3]*Statistical Abstract of the U.S.: 1967*, p. 212.

engineering and behavioral research have been employed. Engineering research experiments with fire retardant sprays for roadsides, fireproofing practices in campgrounds, clearing of fuels from around forest residences, and other practices have resulted in improved means of modifying the environment to reduce fire hazard. Research into social factors in fire prevention has been concerned with, among other things, the practice of woods burning in the South, and, in California, the identification of persons who may present a relatively high fire-threat to forests.

Purpose of Study

The purpose of this bulletin is to report some findings from a study conducted in Utah County, Utah, regarding forest fire prevention knowledge, and attitudes; and, where possible, to compare the Utah findings with those previously reported from California.[4] More specifically, the principal purposes in both studies were fivefold: (1) to determine the kind and amount of visits that people were making to public forests, (2) to identify the social characteristics of people who were making these visits, (3) to measure the amount of information people had about preventing forest fires and their attitudes concerning doing so, (4) to discover how

[4]Folkman, William S., *Residents of Butte County, California: Their Knowledge and Attitudes Regarding Forest Fire Prevention*, U.S. Forest Service Research Paper PSW-25, Pacific Southwest Forest and Range Experiment Station, Berkeley, California, 1965.

Canyon south of Timponuke.

people obtained reliable information about forest-fire prevention, and, (5) to recommend more effective programs for fire prevention on the basis of the information obtained in the studies.

The study was a joint endeavor of Pacific Southwest Forest and Range Experiment Station and Brigham Young University, with most of the financial costs being met by the former.

Method of Study

In both Utah and Butte Counties a representative sample of the resident population was interviewed to obtain the data for the studies. An area-sampling design was developed in both counties to provide representativeness for all age groups 14 years of age or over and not just household heads. In Utah County the sample consisted of 901 persons, whereas in Butte County there were 761 respondents.

Nonresponse did not seem to effect the representativeness of the sample. Less than 2 percent of potential respondents in Utah County refused to participate in the study, while less than 4 percent of those in Butte County refused to participate. Comparing data on age, marital status, grades of school completed, and income from the samples with the 1960 population census indicated that adequate representativeness was achieved.

Trained interviewers were used in the field work for the study. Letters were mailed to potential respondents in the Utah County study explaining the purpose of the study and giving an approximate time when the interviewer would visit the respondent for the interview.

Number and Kind of Visits Made to National Forests

To ascertain the degree and nature of the threat to public forest lands presented by people it is necessary to know, among other things, the kind and amount of activity in which people engage in national forests.

As shown in Table 1, the number of visits to national forests by Utah County residents to wildland areas was somewhat higher than that of Butte County residents. Nearly nine out of ten of the Utah County residents had visited the national forests at least once during the year prior to their being interviewed. This finding suggests that such visits are important to a large percentage of residents of Central Utah. Moreover, it suggests that those having the responsibility for the preservation and optimum use of these forests in this area must be concerned with the attitudes and behavior of the great majority of the people and plan accordingly.

Utah County residents' participation in outdoor recreational activities was similar in many respects to that of Butte County residents and also to that of people elsewhere in the West and throughout the United States (Table 2).

The percentage of people who engaged in fishing and picnicking was about the same in all areas (Table 2). In Utah and Butte Counties a higher percentage of the people went camping, hiking, and hunting than did those in the West or in the United States generally. Participation in hunting was particularly high among Utah County residents, while sightseeing and hiking were considerably less than among the California population.

Some activities are considered to present a greater threat to forests

than others, because fires are an inherent part of them. In this regard, Utah County residents were asked to specify the activities in which they had engaged during the past year in national forests which involved the use of a campfire. As shown in Table 3, these questions revealed that a higher percentage of people had made campfires in connection with camping than any other activity. When the principal activity of people is camping, regulations can be established which may be "fireproofed" through clearing brush away from the area, building fireplaces, and other means. Such fireproofing is equally useful for picnicking. Hunting and hiking, however, may pose an even greater fire threat to forests owing to the fact that hunters and hikers frequently travel well away from main roads and protected areas. As previously shown in Table 2, a greater percentage of all people engage in hunting than engage in camping in the national forests in Utah County. Thus, while campfires are not associated with hunting as frequently as they are with camping, more fires may be used in hunting activities in places that are relatively unprotected.

In summary, fire-prevention plans and programs for Utah County residents should incorporate the information that (1) nearly all of them visit national forests each year, (2) sightseeing, picnicking, fishing, and hunting—in that order—are the activities most commonly engaged in, and, (3) fires are used more than half of the time by campers, picnickers, and hunters.

Characteristics of Frequent Visitors to National Forests

To adequately plan fire prevention and other programs for national forests, it is necessary to know as much as possible about the people who visit the forests, to know what they generally do in the forests, and whether they use fire in doing it.

Slightly less than one-half (44 percent) of the Utah County respondents had visited the national forests ten or more times in the year prior to their being interviewed. These "frequent visitors" had social and economic characteristics which were different from the remaining 56 percent of the respondents—the "less frequent visitors." Detailed data concerning each of the characteristics discussed below are given in Appendix Table 1.

Age—The "frequent visitors" tended to be younger than the "less frequent visitors." Their average (median) age was 31.7 compared with 51.7 for the "less frequent visitors." Perhaps this finding reflects the greater physical activity of younger people as well as the emphasis on out-of-doors living currently in vogue among the youth.

Sex—It was expected that the "frequent visitors" to national forests would be comprised of a higher proportion of males than females. Most wildland activities traditionally have been identified as masculine activities. This expectation was reinforced by the earlier finding that the "less frequent visitors" were older—and women tend to live longer than men —and the observation that sightseeing, picnicking, fishing, and hunting —the latter two being physically demanding activities—are the activities most often engaged in on national forest lands. While no sex differences were expected relative to participation rates for sightseeing and picnicking, it was supposed that males would engage in fishing and hunting more frequently than females. This expec-

Recreation in forest lands.

tation was confirmed. With males making up 45 percent of the total sample, they comprised 50 percent of the "frequent visitors" and 41 percent of the "less frequent visitors." This finding was similar to that found in Butte County, California.

Marital Status—It was expected that a disproportionate number of single persons would be in the "frequent visitors" category, primarily because of factors related to the relatively young age of unmarried persons such as a penchant for outdoor, vigorous activity, and a lack of ties to family and jobs. Analysis of the data showed that single persons did, in fact, tend to be disproportionately represented in the "frequent visitors" category. However, as in Butte County, the significant finding regarding marital status and frequency of forest visits pertained to the widowed, divorced, or separated. Three times as many people who were widowed, divorced, or separated were in the "less frequent visitors" category as were in the "frequent visitors" category. Of the "frequent visitors," 16 percent were single, 79 percent were married, and only 5 percent were widowed, divorced, or separated.

Years of School Completed—As was observed in Butte County, Utah County residents who had completed high school or college tended to frequent the national forests more than those who had some high school training or grade school training only. In general, however, the difference in educational attainment between "frequent" and "less frequent"

visitors was small, averaging .4 school years completed.

Occupational Status—In Utah County, employed people and students tended to be "frequent visitors" to national forests. Retired and disabled persons and housewives were "less frequent visitors" more often than not. Part-time workers were evenly divided between "frequent" and "less frequent" visitors. This finding corroborates a similar observation in Butte County.

Occupation—The most "frequent visitors" found in Utah County were professional workers, followed by craftsmen and operatives. "Less frequent visitors" were most likely to be farmers or sales workers. Manager-proprietors, clerical workers, service workers, and laborers were about equally divided between "frequent" and "less frequent" visitors.

In Butte County, manager-proprietors were found to be most active in the wildlands, followed by laborers, craftsmen, and professional workers. Farmers and service workers were found to frequent the wildlands least in California.

Family Income—Frequency of visits to national forests is positively related to the total income of families. The higher the total family income, the greater the likelihood that the respondent from that family would be a "frequent visitor" to the national forests. The only exception to this generalization occurred among people in the highest income category, $15,000 per year or higher. Members of families with this income tended to be "less frequent visitors."

Residence—A slight tendency was noted for nonfarm residents of the open country, and small town residents to be "frequent visitors," and for city dwellers and farm residents to be "less frequent visitors." However, this relationship was so small as to be relatively unimportant in distinguishing between "frequent" and "less frequent" visitors to the national forests.

Relationships between participation in specific activities in national forests and various social and economic characteristics are similar to those shown to total activity (Table 4). Generally, those Utah County residents who were relatively young, wealthy, well-educated, male, single, employed as craftsmen or in similar jobs, were those most likely to participate in camping, hiking, hunting, etc., in the national forests. There are many exceptions to this generalization however. When values shown in Table 4 range from .10 to .98, it may be concluded that the socio-economic item considered does not clearly differentiate between participants in the activity. Thus, for example, concerning the socio-economic item "migratory status" and the activity of picnicking, Utah County residents of less than one year were not any less (or more) likely to have picnics in the national forests than residents of 10 years or more. On the other hand, if the values shown in Table 4 range from .001 to .05, the amount of activity is related to the socio-economic characteristic. Concerning "previous residence" and hunting, for example, those residents who had previously lived in an open country area were the ones most likely to participate in hunting in national forests.

Knowledge about Fire Prevention

Knowledge about fire prevention and fire behavior was measured by asking respondents 12 questions. In Appendix Table 2, the responses of Utah County residents are shown with those from Butte County.

In most of the questions concerning forest-fire knowledge, a higher percentage of Utah County residents correctly answered the questions than did Butte County residents. There was usually a 5 to 15 percentage point difference between the Utah County residents and the Butte County residents. However, on some questions the percentage differences were much greater. This was true for the questions on correct method of putting out a fire, and concerning the meaning of "watershed." The difference was particularly large regarding the question on the meaning of "watershed." This latter difference is perhaps explained by the fact that Utahns, living in a reclaimed desert area, are particularly dependent upon watersheds, use the term frequently in communications, and would be expected to know the meaning of this term.

Throughout the United States generally 90 percent of forest fires are man-caused; whereas in Utah only 65 percent of the fires are man-caused. This finding suggests that perhaps one reason the incidence of man-caused fires is relatively low in Utah is that knowledge of forest-fire prevention is relatively high. Other reasons that may account for the relatively low incidence of man-caused fires in Utah include the following: (1) types of fuels, weather differences and length of fire season, (2) the relative frequency of thunderstorms in highly forested areas with attendant lightning fires, (3) the relatively high participation of Utah boys in the Boy Scouts of America programs which emphasize

Lodge Pole Campground.

conservation (Within the area covered by the Utah National Parks Council of the B.S.A., 93 percent of the boys of scout age are registered with the B.S.A.), (4) understanding of the national forests as being watersheds upon which most of the people of the state depend for water, (5) the relatively low incidence of the use of cigarettes owing to the religious values of the majority of the state's population, and, (6) effectiveness of fire-prevention programs.

The mean percentage scored by Utah County residents on all 12 questions in the knowledge inventory was 81 (Table 5). From this table it can be seen that those people who were in the national forests relatively often tended to answer the questions correctly only slightly more than did other people. Those people who worked in the national forests did somewhat better on the inventory than those who did not. The mean score of hunters and fishermen was nearly perfect (96 percent) and was markedly higher than participants in any other activity.

In addition to the characteristics mentioned, level of living was positively associated with knowledge of forest fire prevention. That is, people who were relatively "well-to-do" were found to possess somewhat more accurate knowledge about forest fires than others. Contrary to expectations, however, knowledge about forest fires was not associated with the use of mass media, with the exception of newspaper reading. Thus, no statistically significant differences were observed in the fire-knowledge scores of people who watched television, listened to radios, and read magazines in varying amounts of time. However, fire-knowledge scores tended to be higher for those respondents who read two or more newspapers than for those who did not.[5]

Attitudes Toward Fire Prevention

Attitudes are difficult to measure. If they can be measured, however, they are useful in predicting behavior. An attitude might be considered as, "the thought that precedes the act."

To obtain information concerning the importance of forest-fire prevention to residents of Utah and Butte Counties, they were asked to indicate their agreement with the following statement: "Forest-fire danger in this area is highly overrated." The percentage responses to this statement are given below:

[5]Further details concerning this aspect of the study may be found in Adams, Jesse Loraine. *Association Between the Use of Mass Media and Forest-Fire Prevention Knowledge of Utah County Residents*, unpublished master's thesis, Brigham Young University, Provo, Utah. August 1966.

Response	Utah County (N=901)	Butte County (N=761)
Strongly agree	1.1	2.0
Agree	5.3	5.4
Undecided	14.1	18.4
Disagree	65.7	56.2
Strongly disagree	13.8	16.3
Don't know, or no answer	*	1.7
	100.0 Percent	100.0 Percent

*Tabulated with the "Undecided."

Adding together the "disagree" and the "strongly disagree" responses gives the total of those who definitely think that the forest-fire danger is not highly overrated. Approximately 80 percent of the Utah County and 73 percent of the Butte County residents share this opinion.

To determine the extent to which a threat to their personal property may be felt by residents of Utah and Butte Counties, respondents were asked: "How much danger do you consider your home to be in from forest fires?" A percentage distribution of their responses is given below:

Response	Utah County (N=901)	Butte County (N=761)
Serious danger	5.1	3.9
Some danger	18.9	18.9
Little or no danger	75.9	77.4
Don't know, or no answer	.1	.1
	100.0 Percent	100.0 Percent

The responses to this question are almost identical for Utah and Butte County residents. About one-fourth of them expressed their opinion that their homes were threatened by forest fires.

The responses to these questions suggest that the majority's opinion about forest fires being threats derives more from a feeling of concern for the property of others or public property than from a feeling of concern for their own property.

That the majority of Utah County residents have rather keen feelings of responsibility for national forest lands was revealed in this study. For example, responses to the question, "How much does it bother you to see someone flip a burning cigarette onto the ground in a national forest?" were tabulated as follows:

Response	Percentage (N=901)
Very much	76.8
Much	20.0
Little	2.2
Very little	.6
Not at all	.4
	100.0 Percent

It can be seen that about 97 percent of the respondents are bothered "very much" or "much." By summing the responses of "little," "very little," and "not at all," it may be concluded that about 3 percent of the respondents had attitudes which offer little toward preventing forest fires.

Similarly, 95 percent of the respondents indicated that they were bothered "very much" or "much" when they learn that forest fires were started by careless campers.

Questions designed to reveal what kind of action respondents believed they ought to take and actually might take if exposed to a fire situation provide some indication that nearly all of them would take some positive action to put it out. The questions asked dealt with a hypothetical situation:

> Suppose that you are driving past a vacated campground in a national forest and notice a fire small enough that you might be able to put it out is burning toward a hillside covered with dry grass and timber. What do you think you *ought* to do under ordinary circumstances?

Responses were as follows:

Responses	Percentage (N=901)
Attempt to put it out	87.9
Report the fire	10.2
Hope somebody comes by whose responsibility it is to put out fires	1.6
Other	.3
	100.0 Percent

When asked what they thought they actually would do when faced with the situation described above, 85 percent of the respondents said that they would attempt to put out the fire, 10 percent indicated they would report the fire, 1 percent said they would not worry about it, and the remaining 4 percent gave indecisive answers such as "don't know."

It is quite obvious from this data that the great majority of people interviewed feel a responsibility toward the national forests. One must discount, somewhat, socially acceptable answers to questions of this type. However, the strength of this attitude is such that it would most likely motivate many of these people to not only prevent forest fires but actually take an active part in fighting them should the occasion arise.

On the basis of these and other questions asked in the interviews, however, it appears that about 5 percent of the respondents have attitudes which offer little protection to the forests. Moreover, some respondents had attitudes which suggested that hostile acts toward national forests might be expected as a result.

An analysis of these data revealed that responsible attitudes and actions were found to be characteristic of older, urban-dwelling, fire-experienced, authority-tolerant, and fire-knowledgeable persons. On the contrary, people who were younger, divorced (or widowed or separated), mobile, hostile toward authorities, unaware of forest-fire dangers, and inexperienced with forest fires were those with unfavorable attitudes and actions of responsibility.[6]

Sources of Forest Fire Knowledge

It is most difficult in a study of this kind to determine where people actually obtain their knowledge about forest-fire prevention and dangers. Most likely this information is transmitted to each individual through a normal process of socialization by parents, other relatives, friends, teachers, church leaders, scout club leaders, and many other persons in addition to a person's own efforts through reading, watching television, listening to the radio, and through other means. An attempt was made, however, to measure the effect of mass communications in providing certain information.[7]

News Programs as Sources of Forest Fire Knowledge: Respondents were asked if they remembered reading about, or hearing of any forest fires that occurred in Utah during the previous year from newspapers, radio, or TV news programs. Slightly over half (58 percent) of the respondents indicated that they had heard or read about forest fires in Utah from newspapers, radio, or TV. Forty-two percent of the respondents indicated they could not remember getting news of forest fires from the radio, TV, or newspapers.

[6]William S. Folkman, Robert J. McLaren, and John R. Christiansen, "Public Responsibility for Natural Resources," U.S. Forest Service Research Note PSW-165, Pacific Southwest Forest and Range Experiment, Berkeley, California, 1968.

[7]See Appendix Table 3 for supplemental information.

To determine what kind of messages were remembered best, respondents were asked what news about fires they remembered most clearly. The responses to this question were categorized and are presented below:

Response	Percentage (N=901)
Location	27.1
Life and property losses	2.7
Fire-fighting techniques	2.4
Conservation losses	2.7
Type of fire	2.1
Fire prevention	.3
Other	5.8
Nothing remembered	56.9
Total	100.0

Less than half of the respondents remembered reading or hearing any "news" of forest fires in Utah. Of those who said they did remember such news, the majority (57 percent) responded that television had kept them most informed of forest fires. Twenty-five percent of the persons remembering forest-fire news indicated that newspapers kept them best informed, whereas 18 percent of these respondents said the radio was their best source.

Radio "Commercials" as Sources of Forest-Fire Knowledge: When asked whether they recalled hearing any "commercials" on the radio relative to forest-fire prevention, 64 percent of the respondents answered "yes," and 36 percent responded "no." Further questioning revealed that Smokey Bear was first remembered in the commercials more than any other item. Over half (57 percent) of the respondents remembering hearing radio commercials said "Smokey Bear" first when asked about the content of radio commercials dealing with forest fires. This response was much ahead of the next most frequently mentioned messages which concerned information about putting out campfires (14 percent) and information about disposing of cigarettes (10 percent). Other remembered messages included putting out matches (6 percent), and the destruction caused by fires (3 percent).

Television "Commercials" as Sources of Forest-Fire Knowledge: Most (86 percent) of the respondents recalled seeing television commercials dealing with preventing forest fires during the year preceding the interviews. When asked what, if anything, they remembered about the commercials, 70 percent of the respondents first mentioned "Smokey Bear." This response was followed in frequency by "information about putting out campfires" (10 percent), and "information about disposing of cigarettes" (8 percent).

Newspaper Articles as Sources of Forest-Fire Knowledge: Slightly more than half (51 percent) recalled reading newspaper articles on forest fires during the previous year. Smokey Bear was first mentioned by 39 percent of the respondents as being remembered in the article. This response was followed by putting out campfires (15 percent), destruction caused by fires (11 percent), disposing of cigarettes (10 percent), putting out matches (6 percent), and miscellaneous answers (19 percent).

Sources of Knowledge About "Extreme" Fire-Danger Conditions: The respondents were asked if they knew when forest-fire danger in Utah was "extreme," and if so, how they became aware of it.

In response to this question, 90

percent of the respondents said they were aware when the danger of fires in the national forests of Utah was "extreme," and 10 percent said they were not. Relative to the question of how they were made aware of "extreme" fire conditions in the forests. the responses of those indicating they were aware of "extreme" conditions were distributed as follows:

Rank of News Source	News Source	Percentage (N=815)
1	Television	33.3
2	Own observations	21.8
3	Radio	18.5
4	Newspapers	12.8
5	Signs or posters	10.3
6	Other sources	3.3
	Total	100.0

Recommendations for More Effective Forest-Fire Prevention Programs

It is difficult, if not impossible, to portray all possible ways in which the information given in this study can be used to better existing forest-fire prevention programs. This is because no writer or group of writers can represent the experience, jobs, problems, and abilities represented in the potential readers of this publication. It is the reader who must make the bulk of the recommendations that ought to come from a study like this. Some suggestive conclusions will be given, however, which may assist the reader in formulating his own applications of the data:

1. Most of the people of Utah County visit the national forests during the year. Thus, educational programs ought to be geared to all the people, but have an emphasis on that segment of the people who are most active in the forest and most ill-informed about fire dangers.
2. Although not directly revealed through the data presented, Utah County residents tend to believe that the national forests are *their* forests—not the government's—and, because they own them, they should have a say in their management, be welcome in the national forests, and be treated politely and courteously by government employees.
3. Future planning for national-forest use should be done with the continuing understanding that many times as many people that use the forests now will be using them in the next few years for recreational purposes.
4. Fire is, and will increasingly be, used in the national forests by visitors. Research and programs designed to "fireproof" greater areas of the national forests should be developed.
5. Coupling the information that Utah County residents know the "watershed" con-

cept well and were able to recall location of fires from news media, suggests that fire - prevention propaganda be oriented toward notions of saving one's own property, water supply, recreational sites, etc., through preserving the watersheds. Moreover, by appealing to the feeling among these residents that the national forests are *theirs*, greater aid in discouraging or apprehending fire-regulation violators might be obtained.

6. Lacking mandatory fire prevention instruction in Utah such as is taught in the California public schools, and recognizing that most boys in Utah are registered with the Boy Scouts of America, extensive fire prevention programs should be carried out through the Boy Scouts. Conservation programs might be cosponsored by the national forests and the Boy Scouts of America more than they are now to reseed burnt-over areas, build antierosion dams, etc. During these programs forestry officials should take an *active* part and in doing so explain the causes, results, and preventive aspects of forest fires. The possibility of having a merit badge in forest-fire prevention and fighting should be considered. A part of the requirements for such a badge might be a workshop wherein boys could be given instructions in conducting fire-prevention activities, building firelines, use of fire-fighting tools and techniques, as well as theory in prevention and control of forest fires. These workshops could be made very enjoyable for the boys and officials.
7. "Smokey Bear" as a symbol of fire prevention should certainly be retained, at least until evidence contrary to that revealed in this survey suggests otherwise.
8. More research is needed to evaluate the effectiveness of mass media as informational tools. This study suggests that their influence may be negligible. It is possible that mass media approaches should be supplemented by person - to - person contacts with national forest visitors by well-trained, courteous, and tactful forestry officers. Such contacts may have a more lasting effect in informing and promoting desirable attitudes and behavior.
9. More research is needed to identify the national forest users who are hostile and irresponsible in their behavior, and to plan programs which might reduce this hostility and irresponsibility, and/or the extent of their activities in the national forests. Thus, for example, a program to measure the reduced effect, if any, of having rangers appear less military in their dress might be called for. Or, changing the image of the ranger from that associated with the police or game wardens might involve his not being responsible for investigating fires.

Changing the attitude of Forest Service personnel as well as others regarding the forests might be useful too. For

example, the attitude of possessiveness on the part of some Forest Service employees summed up by the statement, "This is *my* district," can not help but reduce the feeling of responsibility that the public has for those lands. On the other hand, an increased effort to inform the public that these are *their* lands, and that the Forest Service needs their help in protecting and conserving them so that *all* may share and enjoy them may be the kind of public-relations stance that will be helpful today and vital in the future.

Coal Mine Hollow ridge.

Table 1.—Number of visits to wildland areas made by residents of Utah and Butte Counties in 1965 and 1964, respectively

	Percentage Distribution	
	Butte County	Utah County
Number of wildland visits	(N=761)	(N=901)
None	24	12
1 - 2	11	12
3 - 5	17	16
6 - 10	16	20
11 or more	32	38
Don't know or no answer	0	2
	100	100

Table 2.—Participation in outdoor activities of residents of Utah and Butte Counties compared with national and regional participation[1]

Activity	Percent Participation			
	United States	West	Butte County	Utah County[3]
Camping	8	17	36	25
Picnicking	53	54	53	55
Hunting	[2]13	[2]14	24	37
Fishing	29	30	36	42
Hiking	6	9	38	22
Ranching or other work connected with occupation	....	....	17	5
Other activity	....	....	18	5
Sightseeing	42	55	....	....
(Driving for pleasure)	52	56	82	65

[1]Data for the United States and Western Region are from Outdoor Recreation Resources Review Commission, National Recreation Survey, ORRRC Study Report 19, 394 pp., 1962. In a number of ways the data are not comparable. The national survey included respondents 12 years of age and over; the survey of Utah and Butte Counties included those 14 years of age and over. The national survey data reported are for the period from June through August (except for hunting which is for September through December); the data of Utah and Butte Counties are for the entire year.

[2]Period reported is September through December.

[3]Questions pertaining to outdoor recreational activities in Utah County were restricted to participation in national forest areas only.

Table 3.—Ranking of outdoor activities in national forests according to percentage of Utah County residents who participate in them, and use of fire in connection with them

Activity	Percentage of Utah County residents who participated during year	Rank according to participation	Percentage of time fire was used in connection with activity	Rank according to use of fire
Sightseeing (Driving for pleasure)	65	1	5	8
Picnicking	55	2	59	2
Fishing	42	3	36	4
Hunting	37	4	53	3
Camping	25	5	76	1
Hiking	22	6	31	5
Ranching or other work connected with occupation	5	7	23	6
Other activity	5	8	22	7

Table 4.—Relationship of wildland activities to certain socio-economic characteristics, Utah County, 1966

Item Number	Working	Camping	Fishing	Hiking	Hunting	Picnicking	Driving	Other
Reporting Part.	47	230	382	199	331	500	587	45
Age	.05	.001	.001	.001	.001	.001	.001	.05
Marital status	.02	.001	.001	.001	.001	.001	.001	.20
Education	.01	.01	.30	.30	.01	.001	.01	.70
Job status	.02	.001	.05	.001	.001	.001	.01	
Type of work	.001	.30	.05	.001	.001	.50	.90	.05
Family income	.005	.005	.005	.005	.005	.005	.005	.1
Sex	.001	.10	.001	.50	.001	.02	.50	
Time Lived in Present residence	.10	.02	.30	.50	.50	.50	.50	.50
Previous residence	.30	.90	.10	.70	.001	.02	.01	.001
Migratory status	.50	.20	.20	.01	.70	.98	.05	.05

Table 5.—Fire-prevention knowledge score related to types of wildland activity

	Number Reporting Activity	Mean Score (Percent Correct)
Activity Total	901	80.95
Frequency of wildland use:		
None	112	79
1 - 4	203	79
5 - 9	174	81
10 - 19	181	81
20 - 49	153	82
50 - 99	44	82
100 - 199	8	81
200+	6	90
DNA	20	
Work in wildlands:		
No	854	81
Yes	42	83.4
DNA	5	
Hunting	331	96
Camping	230	81
Fishing	382	96
Hiking	199	82
Picnicking	500	81
Sightseeing (driving)	587	79
Other	45	82

Appendix Table 1.—Wildland activity related to certain socio-economic characteristics, Utah County, 1966

Characteristic	Number of respondents	Total number of visits to National Forest								
		None	1-4	5-9	10-19	20-49	50-99	100-199	200+	N.A.	Total
		Percent									
Age:											
14-19	91	2.2	17.8	14.4	36.7	20.0	6.7	1.1	0.0	1.1	100.0
20-24	92	3.3	19.6	17.4	20.7	30.3	7.6	1.1	0.0	0.0	100.0
25-29	83	2.4	16.9	15.7	27.7	26.5	3.6	2.4	1.2	3.6	100.0
30-39	152	3.3	17.1	19.7	27.6	21.1	6.6	1.3	0.7	2.6	100.0
40-49	131	6.1	24.4	22.9	19.8	16.8	4.6	0.8	3.1	1.5	100.0
50-59	127	15.0	28.3	23.6	16.5	11.0	2.4	0.8	0.0	2.4	100.0
60-69	116	25.9	24.1	24.1	7.8	11.2	5.2	0.0	0.0	1.7	100.0
70 and over	106	40.6	30.2	10.4	7.5	3.8	2.8	0.0	0.0	4.7	100.0
N.A.	3	0.0	33.3	66.7	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Total	901	12.4	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0
Sex:											
Male	409	9.6	20.9	18.6	18.6	20.8	6.6	0.7	1.5	2.7	100.0
Female	492	14.9	24.0	19.6	21.4	13.8	3.5	1.0	0.0	1.8	100.0
Total	901	12.4	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0
Marital Status:											
Single	122	5.8	24.8	15.7	28.1	17.4	6.6	0.8	0.0	0.8	100.0
Married	672	8.8	21.5	21.0	20.7	18.5	5.4	1.0	0.7	2.4	100.0
Widowed, divorced or separated	107	43.0	26.2	12.1	7.5	7.5	0.0	0.0	0.9	2.8	100.0
Total	901	12.4	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0
Years of school completed:											
0-4	6	66.6	16.7	0.0	0.0	0.0	0.0	0.0	0.0	16.7	100.0
5-7	32	40.6	21.9	3.1	9.4	18.8	3.1	0.0	0.0	3.1	100.0

8	81	27.2	30.8	21.0	4.9	6.2	7.4	0.0	0.0	2.5	100.0
9-11	263	11.8	25.9	19.5	21.0	13.7	5.0	0.8	0.0	2.3	100.0
12 (high school graduate)	315	6.0	20.0	20.0	25.2	20.6	3.8	1.9	0.6	1.9	100.0
13-15 (some college)	151	12.6	16.6	21.8	19.9	19.9	5.3	0.0	2.6	1.3	100.0
16 (college graduate)	35	5.7	28.5	14.3	25.7	22.9	0.0	0.0	0.0	2.9	100.0
17+ (post graduate)	18	11.1	22.1	16.7	5.6	16.7	22.2	0.0	0.0	5.6	100.0
Total	901	12.4	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0
Occupational status:											
Full time	337	7.7	20.2	18.7	19.9	22.5	5.9	1.2	1.8	2.1	100.0
Part time	167	9.6	22.3	16.9	25.9	18.1	5.4	0.6	0.0	1.2	100.0
Retired or disabled	85	32.8	31.8	16.5	4.7	5.9	2.4	1.2	0.0	4.7	100.0
Housewife	262	13.4	22.4	20.6	21.4	14.5	4.2	0.8	0.0	2.7	100.0
Student	34	2.9	23.5	35.4	23.5	8.8	5.9	0.0	0.0	0.0	100.0
Other	16	39.9	26.7	6.7	20.0	6.7	0.0	0.0	0.0	0.0	100.0
Total	901	12.4	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0
Occupation:											
Professional, technical	40	5.0	15.0	20.0	25.0	22.5	12.5	0.0	0.0	0.0	100.0
Farmer, farm manager	48	12.5	18.8	22.9	4.2	31.1	2.1	4.2	2.1	2.1	100.0
Manager, official, proprietor	46	10.9	32.5	26.1	15.2	10.9	0.0	0.0	2.2	2.2	100.0
Clerical	31	12.9	19.4	12.9	25.7	22.6	0.0	0.0	0.0	6.5	100.0
Sales	425	17.2	24.7	20.5	18.6	12.7	3.3	0.9	0.0	2.6	100.0
Craftsman	72	2.8	18.1	18.1	23.6	24.9	8.3	0.0	2.8	1.4	100.0
Operative	76	7.9	13.2	15.8	26.3	22.4	6.6	2.6	1.3	3.9	100.0
Service	102	10.9	25.7	14.9	18.8	19.8	7.9	0.0	1.0	1.0	100.0
Laborer	60	5.0	21.7	18.3	31.6	16.7	6.7	0.0	0.0	0.0	100.0
D.N.A.	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
Total	901	12.5	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0

Family income:											
Under $1500	90	41.2	32.2	10.0	6.7	4.4	2.2	0.0	0.0	3.3	100.0
$1500 - 2999	108	21.3	35.2	19.4	11.1	7.4	1.9	0.0	0.0	3.7	100.0
3000 - 4499	109	11.9	24.9	17.4	17.4	18.3	6.4	0.9	0.0	2.8	100.0
4500 - 5999	219	5.0	20.2	21.6	22.9	22.9	2.8	1.4	0.9	2.3	100.0
6000 - 7999	202	7.9	16.3	19.3	30.3	16.3	5.9	1.0	1.0	2.0	100.0
8000 - 9999	104	6.7	17.3	19.2	23.1	24.0	6.7	1.0	1.0	1.0	100.0
10,000 - 14,999	53	5.7	18.9	20.8	17.0	22.5	13.2	1.9	0.0	0.0	100.0
15,000+	12	8.3	25.0	41.8	0.0	8.3	8.3	0.0	8.3	0.0	100.0
Other	4	25.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Total	901	12.9	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0
Residence:											
Open country, farm	116	11.3	22.6	22.6	27.0	12.2	1.7	0.0	0.0	2.6	100.0
Open country, nonfarm	59	6.8	22.0	20.3	23.8	16.9	3.4	5.1	0.0	1.7	100.0
Small town village	124	8.1	23.3	19.4	21.0	18.5	7.3	0.8	1.6	0.0	100.0
City	602	14.1	22.4	18.4	18.3	17.6	5.1	0.7	0.7	2.7	100.0
Not reported	....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	000.0
Total	901	12.4	22.6	19.2	20.1	17.0	4.9	0.9	0.7	2.2	100.0

Appendix Table 2.—Items comprising the knowledge inventory, showing percentage distributions of responses to individual questions for Utah and Butte County residents

		Utah County responses (N=901)	Butte County responses (N=761)
		Percent	
1.	Green trees and shrubs of Utah (California)		
	Are very difficult to burn	21.1	19.6
	Will not burn at all	2.3	1.6
	Will catch fire and burn very rapidly	52.1*	43.4*
	Will burn only in the hot summer months	24.3	27.7
	Do not know	.2	7.7
2.	The safest method for lighting cigarettes in the forest is to use		
	Book-type safety matches	15.1	19.3
	Strike anywhere, stick-type matches	.6	1.2
	Stick-type safety matches	5.0	8.3
	A hand cigarette lighter	78.8*	65.4*
	Do not know	.5	5.8
3.	The surest way to put out a campfire, assuming all these methods are available, is to		
	Pour water on it	7.4	7.1
	Completely cover with dirt	6.1	34.3
	Pour water on it and stir thoroughly	85.5*	56.6*
	Spread out the embers and let it burn itself out	.6	1.2
	Do not know		
4.	If you are negligent with your campfire or warming fire and it escapes to the property of another, whether privately or publicly owned, you are		
	Not liable for cost of damages done	3.9	....
	Liable for damages and to fine for negligence	73.0*	....
	Liable for damages but not for fine	9.8	....
	Liable for fine but not for damages	12.2	....
	Do not know	1.1	....
5.	If you drive your car off the road in dry grass areas		
	Exhause sparks can start a fire	11.7	18.3
	Sparks made by contact of metal parts of the car with rocks can set fires	6.0	3.7
	Both of the above statements are true	65.8*	61.8*
	Neither of the above statements are true	15.9	5.0
	Do not know	.6	11.2
6.	A sign in a National Forest that reads "Closed Area" means		
	You may enter, but not smoke in the area	.6	3.3
	You may enter, but not build any campfires or smoke in the area	5.4	6.4
	You may not hunt or shoot within the area	4.4	5.6
	You may not enter the area at all	89.4*	74.3*
	Do not know	.2	10.4
7.	Windy weather		
	Tends to put out fires	.4	.3
	Makes necessary more precautions with fires	97.9*	97.1*
	Affects only poorly built fires	.6	.6
	Has little or no influence on fires	.8	.4
	Do not know		
8.	"Humidity" is a measure of		
	Temperature of the air	7.9	7.5

	Amount of rainfall that has fallen in last 24 hours	2.0	2.9
	Percent of cloudiness during the daylight hours	1.2	.9
	Amount of moisture in the air	88.1*	81.2*
	Do not know	.8	7.5
9.	"Watersheds" are		
	Areas where rain falls or snow melts to supply water to springs and creeks	70.6*	47.1*
	Structures over railroads for protection against heavy snow and rain	.9	6.7
	Buildings with gutters that run water to a cistern	2.1	3.4
	Lakes and reservoirs which collect the water runoff from forests	26.2	20.4
	Do not know	.2	22.4
10.	A fire is more apt to start where there is		
	Low temperature and low humidity	2.4	1.6
	High temperature and low humidity	71.2*	62.6*
	High temperature and high humidity	23.4	21.9
	Low temperature and high humidity	2.0	3.0
	Do not know	1.0	10 9
11.	The chief cause of forest fires in Utah (California) is		
	Lightning	13.3*	17.5*
	Campfires	27.7	5.9
	Children playing with matches	3.4	3.0
	Smokers' cigarettes and matches	55.4	58.8
	Do not know	.2	14.8
12.	What percentage of the forest fires in Utah (California) are man-caused?		
	25 percent	7.3	....
	45 percent	19.3	....
	65 percent	32.4*	....
	85 percent	40.3	....
	Do not know	.7	....

* Indicates correct response
— Indicates data are not sufficiently comparable for analysis to be made

Appendix Table 3.—Percentage distributions of Utah County residents according to mass media contacts, 1966

	Percent
Radio station listened to most frequently	
KSL, Salt Lake City	24.8
KCPX, Salt Lake City	11.0
KLUB, Salt Lake City	5.6
KSOP, Salt Lake City	4-1
KOVO, Provo	21.4
KEYY, Provo	1.3
KIXX, Provo	.7
KONI, Spanish Fork	9.6
Some other station	1.3
Do not listen or no answer	20.2
Total	100.0

Amount of time spent listening to radio	
Less than 1 hour	21.0
1 or 2 hours	27.8
3 or 4 hours	15.2
5 or more hours	15.4
Do not listen or no answer	20.6
Total	100.0
Time of day radio is listened to most often	
Midnight to 5:59 a.m.	.6
6:00 a.m. to 7:59 a.m.	23.8
8:00 a.m. to 11:59 a.m.	24.2
Noon until 4:59 p.m.	9.0
5:00 to 7:59 p.m.	10.1
8:00 to 11:59 p.m.	11.3
Do not listen or no answer	21.0
Total	100.0
Television station watched most frequently for news	
KSL	48.4
KCPX	26.9
KUTV	17.3
KUED (University of Utah educational TV)	0.0
KBYU (Brigham Young University educational TV)	0.1
Do not watch or no answer	7.3
Total	100.0
Television station watched most frequently for programs other than news	
KSL	31.9
KCPX	35.4
KUTV	23.8
KUED (University of Utah educational TV)	1.7
KBYU (Brigham Young University educational TV)	.4
Do not watch or no answer	6.8
Total	100.0
Amount of hours spent watching television daily	
Less than 1 hour	9.1
1 or 2 hours	29.0
3 or 4 hours	35.2
5 or more hours	21.6
Do not watch TV or no answer	5.1
Total	100.0

Time of day television is watched most often	
Midnight to 5:59 a.m.	0.0
6:00 a.m. to 7:59 a.m.	1.1
8:00 a.m. to 11:59 a.m.	10.0
Noon until 4:59 p.m.	5.2
5:00 to 7:59 p.m.	17.4
8:00 to 11:59 p.m.	61.0
Do not watch TV or no answer	5.3
Total	100.0
Newspapers read	
Salt Lake Tribune	10.2
Deseret News and Telegram	15.2
Salt Lake Tribune—Sunday only	1.7
Provo Daily Herald	25.7
Local weekly	3.2
Tribune plus local weekly	7.9
Deseret News plus local weekly	14.0
Provo Daily Herald plus local weekly	12.3
Do not read newspaper or no answer	9.8
Total	100.0
Magazines most often read	
News (*Time, U. S. News, Newsweek*, etc.)	17.0
Pictoral news (*Life, Look, Post*, etc.)	1.8
Sports (*Outdoor Life, Field and Stream*, etc.)	11.4
Home (*McCalls, Good Housekeeping*, etc.)	3.9
Children's (*American Girl, Boy's Life*, etc.)	12.7
Church (*Improvement Era*, etc.)	.7
Occupational (*Woolgrower's*, etc.)	27.4
Other	5.4
Do not read magazines or no answer	19.7
Total	100.0